

WHAT IS CLAIMED IS:

1 1. A data storage system comprising:
2 an input part which receives performance requirement parameters concerning
3 storage performance for each of a plurality of data storage areas within the data storage
4 system;
5 a first comparing part which compares the performance requirement
6 parameters with actual storage performance variables;
7 a first detection part which detects at least one data storage area where the
8 actual storage performance variables do not satisfy the performance requirement parameters;
9 and
10 a migration part which migrates data stored in the data storage area detected
11 by the first detection part to another storage area.

1 2. The system of claim 1, further comprising:
2 a calculation part which calculates an average of the actual storage
3 performance variables per unit time;
4 a second comparing part which compares the average and the performance
5 requirement parameters; and
6 a second detection part which detects a data storage area where the average
7 per unit time does not satisfy the performance requirement parameters.

1 3. The system of claim 1, wherein the storage performance is determined
2 by at least one of the following:
3 I/O accessibility;
4 data transfer volume;
5 disk free space rate;
6 disk busy rate;
7 data transfer speed; and
8 an amount of cache resident data.

1 4. The system of claim 2, wherein the storage performance is determined
2 by at least one of the following:
3 I/O accessibility;
4 data transfer volume;

disk free space rate;
disk busy rate;
data transfer speed; and
an amount of cache resident data.

5. The system of claim 1, wherein the migration part performs the

following steps:

staging data into cache;
creating a mirror disk;
varying data redundancy; and
transferring data from one ph

6. A method for providing data storage service, the method comprising:

making a service level agreement concerning a requirement for storage

performance;

setting performance requirement parameters in accordance with the service contract;

monitoring an actual storage performance variable; and
reallocating data stored in a data storage area where the actual storage

performance variable does not satisfy the performance requirement parameters.

7. The method of claim 6 further comprising the steps of:

calculating an average of the actual storage performance variables per unit

refunding a charge paid by a customer if the average did not satisfy the performance requirements in accordance with the service level agreement.

8. The method of claim 7 further comprising the step of reporting the performance variables to the contractor.

9. A method for providing data storage services comprising:

making a service level agreement including requirements for storage

performance;

setting performance requirement parameters in accordance with the service agreement;

6 monitoring actual storage performance variables; and
7 reallocating the data stored in a data storage area when the actual storage
8 performance variables do not satisfy the performance requirement parameters.

1 10. The method of claim 9, wherein the performance requirement
2 parameters are associated with each of the data storage areas, and a charge for data storage is
3 determined in accordance with the performance requirement parameters.

1 11. The method of claim 10 further comprising:
2 calculating an average of the actual storage performance variables per unit
3 time;
4 identifying the data storage area where the actual storage performance
5 variables does not satisfy the performance requirement parameters; and
6 outputting information about the designated data storage area to enable
7 refunding a charge of data storage.

1 12. The method of claim 6, wherein the data reallocation comprises:
2 staging the data into cache;
3 creating a mirror disk;
4 varying data redundancy; and
5 transferring data from one physical volume to another physical volume.

1 13. The method of claim 10, wherein the step of reallocating the data
2 comprises:
3 staging data into a cache;
4 creating a mirror disk;
5 varying data redundancy; and
6 transferring data from one physical volume to another physical volume.

1 14. A method for allocating data storage area within a system comprising
2 of storage device and storage controller, the method comprising the steps of:
3 setting performance requirement parameters for the storage controller, the
4 performance requirement parameters associated with each of a plurality of data storage areas;
5 monitoring access frequency for the data storage areas; and
6 reallocating data stored in a data storage area where the access frequency does
7 not satisfy the performance requirement parameters.

1 15. The method of claim 14 further comprising the steps of:
2 charging for the data storage, the charge being determined in accordance with
3 the performance requirement parameters; and
4 reducing the charge if the performance requirement parameters are not
5 satisfied, the reduction being made in accordance with a length of time while the performance
6 requirement parameters are not satisfied.

1 16. The method of claim 14 wherein the storage performance is
2 determined by at least one of the following:

3 I/O accessibility;
4 data transfer volume;
5 disk free space rate;
6 disk busy rate;
7 data transfer speed; and
8 an amount of cache resident data.

1 17. The method of claim 16, wherein the data reallocation comprises:
2 staging the data into cache;
3 creating a mirror disk;
4 varying data redundancy; and
5 transferring data from one physical volume to another physical volume.

1 18. A method of managing a data storage system accessed via a network,
2 wherein the system is comprised of a network connected server, and a data storage system
3 connected to the server, the method comprising:

4 receiving at least one performance requirement parameter indicating system
5 performance desired by a contractor, wherein each performance requirement parameter
6 received to the data storage system is associated with a particular data storage area;
7 checking actual storage performance by referring to the performance
8 requirement parameter; and
9 migrating data stored in the data storage area if the actual storage performance
10 does not satisfy the performance requirement parameter.